

What is claimed is:

1. A synchronous clock supply system comprising:
 - 2 at least one relay node which is positioned in
 - 3 a clock supply route formed by coupling arbitrary
 - 4 virtual paths for nodes in a network; and
 - 5 a termination node which is positioned in a
 - 6 downstream side of the clock supply route farther than
 - 7 the relay node from a synchronous clock sending source
 - 8 used to synchronize the nodes in the network, and
 - 9 finally receives the synchronous clock via a
 - 10 predetermined port,
 - 11 the relay node having
 - 12 fault detection means for, when no synchronous
 - 13 clock is supplied in a downstream direction from an
 - 14 upstream side of the clock supply route due to a fault
 - 15 in the virtual path, detecting that no synchronous clock
 - 16 is supplied,
 - 17 fault notification data transmission means
 - 18 for, when said fault detection means detects the fault,
 - 19 sending fault notification data representing occurrence
 - 20 of the fault to the downstream side of the clock supply
 - 21 route, and
 - 22 first port switching means for, when switching
 - 23 instruction data designating switching to another port
 - 24 for supply of the synchronous clock is sent in the
 - 25 upstream side from the downstream side of the clock

26 supply route, switching a port for receiving the
27 synchronous clock to the port, and
28 the termination node having
29 second port switching means for, when another
30 port is connected to the sending source via another
31 virtual path and the fault notification data is sent
32 from the relay node, performing port switching for
33 supplying the synchronous clock from the predetermined
34 port to said another port, and
35 port switching instruction means for, when
36 said port switching means performs port switching,
37 sending switching instruction data which instructs the
38 upstream side of the clock supply route to switch the
39 port to said another port for supply of the synchronous
40 clock.

2. A system according to claim 1, further
2 comprising clock sending means for sending the
3 synchronous clock to the clock supply route.

3. A system according to claim 1, wherein
2 the clock supply route includes a plurality of
3 clock supply routes,
4 the synchronous clock is sent to the
5 respective clock supply routes,
6 the relay node includes relay nodes for the
7 respective clock supply routes, and

8 the termination node includes termination
9 nodes for the respective clock supply routes.

4. A system according to claim 1, wherein
2 the synchronous clock includes a synchronous
3 clock which is obtained by extracting a frequency
4 component from a signal used for communication between
5 the nodes and has a unit time as a period,
6 said fault notification data transmission
7 means sends the fault notification data as part of an
8 ATM cell,
9 when the switching instruction data is sent as
10 part of an ATM cell from the upstream direction, said
11 first port switching means switches the port for
12 receiving the synchronous clock to a port which receives
13 the switching instruction data,
14 when the fault notification data is sent as
15 part of the ATM cell from the relay node, said second
16 port switching means switches the port for supplying the
17 synchronous clock from the predetermined port to said
18 another port, and
19 said port switching instruction means sends
20 the switching instruction data as part of an ATM cell.

5. A system according to claim 4, wherein
2 the clock supply route includes a plurality of
3 clock supply routes,

4 the synchronous clock is sent to the
5 respective clock supply routes,
6 the relay node includes relay nodes for the
7 respective clock supply routes, and
8 the termination node includes termination
9 nodes for the respective clock supply routes.

6. A system according to claim 1, wherein
2 a priority is set for a port to be switched,
3 and
4 a clock supply line priority table
5 representing a priority for port switching for supplying
6 the synchronous clock is prepared at each node.

7. A synchronous clock supply method comprising
2 the steps of:
3 sending a synchronous clock used to
4 synchronize nodes in a network from a synchronous clock
5 sending source to a termination node along a
6 predetermined clock supply route via a plurality of
7 nodes;
8 when the synchronous clock sent in the
9 synchronous clock sending step generates a fault in a
10 line after the synchronous clock sending source,
11 detecting the fault at a predetermined port at a nearest
12 downstream node in the fault-generated line;
13 sending fault notification data representing

14 occurrence of the fault from the detecting node in the
15 fault detection step to the termination node;
16 when the fault notification data sent in the
17 fault notification data sending step reaches the
18 termination node, switching a port for receiving the
19 synchronous clock to a port which is connected to a path
20 other than the synchronous clock sending source and the
21 clock supply route and is different from the port that
22 has received the fault notification data at the
23 termination node, and sending back switching instruction
24 data representing port switching through the clock
25 supply route; and
26 switching the receiving port to a synchronous
27 clock reception port at each node which has received the
28 switching instruction data sent in the port switching
29 instruction step.

8. A method according to claim 7, wherein the
2 clock supply route is formed by coupling arbitrary
3 virtual paths for nodes.

9. A method according to claim 8, wherein
2 in the synchronous clock sending step, a
3 frequency component is extracted from a signal used for
4 communication between the nodes in order to synchronize
5 the nodes in the network, and is used as a synchronous
6 clock having a unit time as a period,

7 in the fault notification data sending step,
8 the fault notification data is sent as part of an ATM
9 cell, and
10 in the port switching instruction step, the
11 switching instruction data is sent as part of an ATM
12 cell.